CLAIMS

1. A method for manufacturing a heat exchanger, the method comprising the steps of:

forming a thermally sprayed layer on a surface of an aluminum tube core by thermally spraying Al-Si series alloy brazing material onto the surface of the aluminum tube core to obtain a tube;

applying flux composite containing non-corrosive flux showing zinc substitution reaction onto a surface of the tube;

combining the tube with the fin; and

brazing the tube and the fin in an combined state.

2. A method for manufacturing a heat exchanger, the method comprising the steps of:

forming a thermally sprayed layer on a surface of an aluminum tube core by thermally spraying Al-Si series alloy brazing material onto the surface of the aluminum tube core to obtain a tube;

applying flux composite onto a surface of the tube, wherein the flux composite contains non-corrosive flux showing zinc substitution reaction and binder, the binder being resin having a property in which 90 mass% or more of the resin evaporates at a temperature of 350 °C when a differential thermal analysis is performed under a condition of a temperature rising rate of 20 °C/minute;

combining the tube with the fin; and

brazing the tube and the fin in a combined state.

3. The method for manufacturing a heat exchanger as recited in

claim 2, wherein butyl series resin is used as the resin.

4. A method for manufacturing a heat exchanger, the method comprising the steps of:

forming a thermally sprayed layer on a surface of an aluminum tube core by thermally spraying Al-Si series alloy brazing material onto the surface of the aluminum tube core to obtain a tube;

applying flux composite onto a surface of the tube, wherein the flux composite contains non-corrosive flux showing zinc substitution reaction and binder, the binder being polyethylene oxide having a property in which 90 mass% or more of the polyethylene oxide evaporates at a temperature of 350 °C when a differential thermal analysis is performed under a condition of a temperature rising rate of 20 °C/minute;

combining the tube with the fin; and

brazing the tube and the fin in an combined state.

5. The method for manufacturing a heat exchanger as recited in claim 4, wherein a molecular weight of the polyethylene oxide is 10,000 to 1,500,000.

6. A method for manufacturing a heat exchanger, the method comprising the steps of:

forming a thermally sprayed layer on a surface of an aluminum tube core by thermally spraying Al-Si series alloy brazing material onto the surface of the aluminum tube core to obtain a tube;

applying flux composite onto a surface of the tube, wherein the flux composite contains non-corrosive flux showing zinc substitution

reaction and binder, the binder being paraffin having a property in which 90 mass% or more of the paraffin evaporates at a temperature of 350 °C when a differential thermal analysis is performed under a condition of a temperature rising rate of 20 °C/minute;

combining the tube with the fin; and

brazing the tube and the fin in an combined state.

7. The method for manufacturing a heat exchanger as recited in claim 6, wherein a molecular weight of the paraffin is 200 to 600.

8. The method for manufacturing a heat exchanger as recited in claim 6, wherein one of elements selected from the group consisting of paraffin wax, isoparaffin and cycloparaffin is used as the paraffin.

9. The method for manufacturing a heat exchanger as recited in any one of claims 2 to 8, wherein a mixed mass ratio in the flux composite is set so as to fall within the range of: the binder material / the flux component containing the non-corrosive flux showing zinc substitution reaction = 20/80 to 80/20.

10. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 9, wherein $KZnF_3$ is used as the flux component containing the non-corrosive flux showing zinc substitution reaction.

11. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 10, wherein the flux component containing the non-corrosive flux showing zinc substitution reaction is applied by 5

to 20 g/m^2.

12. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 11, wherein alloy brazing material containing Si: 6 to 15 mass% and the balance being Al and inevitable impurities is used as the Al-Si series alloy brazing material.

13. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 11, wherein alloy brazing material containing Si: 6 to 15 mass%, at least either Cu: 0.3 to 0.6 mass% or Mn: 0.3 to 1.5 mass%, and the balance being Al and inevitable impurities is used as the Al-Si series alloy brazing material.

14. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 11, wherein alloy brazing material containing Si: 6 to 15 mass%, at least either Cu: 0.35 to 0.55 mass% or Mn: 0.4 to 1.0 mass%, and the balance being Al and inevitable impurities is used as the Al-Si series alloy brazing material.

15. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 14, wherein a fin with no brazing material clad is used as the fin.

16. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 15, wherein a flat tube formed by an extrusion is used as the tube.

17. The method for manufacturing a heat exchanger as recited in any one of claims 1 to 16, wherein the brazing is performed at a heating temperature of 550 to 620 °C.

18. A heat exchanger manufactured by the method as recited in any one of claims 1 to 17.